**Micropile Foundations**

A micropile foundation consists of several small-diameter, drilled, and grouted reinforced foundations, arranged in a circular pattern. For electric transmission and power line structure support, a series of approximately 4 to 16 (or more) individual micropiles are arranged in a circular pattern to take the place of a larger conventional reinforced concrete drilled pier that would typically be approximately 4 to 10 feet diameter and 10 to 40 feet deep. One micropile typically consists of a small hole (approximately 6 to 8 inches in diameter) excavated to a depth of approximately 10 to 40 feet, depending on the properties of the soil or rock underlying the surface. A steel rod would be inserted into the hole and centered, and the surrounding annulus is filled with a non-shrink grout. The steel rod would protrude above grade to be connected to a transition steel plate or to a concrete cap supporting the structure above grade. Loads from the above structure would be transferred to the steel rod, and transferred from the rod to the grout to the surrounding soil. A steel pipe or casing is often inserted in the upper portions of the micropile to add strength for shear transfer and to provide for local upper-portion unbonded axial movement of the rod.

The micropiles are typically installed from a platform situated approximately 6 feet above the ground surface. The platforms and all equipment can be placed by truck-mounted crane or flown to sites by helicopter, and include air compressors, a grout plant or grout transfer unit, tool boxes, firefighting equipment, and other installation materials. The platform would be supported on 4 to 6 telescoping legs that can be adjusted to support the platform on slopes. The drilling process takes place from the platform, and the drill rigs are powered by generators or compressors that either rest on the platform or are supported nearby on the ground.

Equipment used for the micropile installations is smaller and more portable than the large drill rigs used for drilled pier excavation and construction, and can be flown in to inaccessible areas. Micropile foundations are more suitable for areas that are inaccessible due to terrain and areas where access may be prohibited due to environmental or agency concerns. Micropile foundations are also suitable for rock areas where excavation of the rock for conventional drilled piers would be difficult and would entail the use of blasting or rock breakers with augers, or core barrels. The spoils and local disturbances created by micropiles are much less than that of conventional drilled concrete piers.

Micropile construction will require the temporary use of noise-generating equipment. Typical noise levels from the equipment is provided in Table 1: Typical Construction Sound Levels, with a reference distance of 50 feet.

**Table 1: Typical Construction Sound Levels – Micropile Construction**

| Equipment[1] | Max Noise at 50 Feet (dBA) |
|---|---|
| Air Compressor | 80 |
| Crane | 81 |
| Drill Rig/Truck-mounted augur | 85 |
| Truck (Dump Truck, Flatbed Truck) | 84 |
| Portable Generator | 73 |

Notes

[1] Noise levels listed are for typical equipment used during micropile construction activities, and not all potential equipment used for the Proposed Project is listed herein. The equipment used is considered to be representative of the equipment that would be used during micropile construction for the Proposed Project.

Source: Federal Highway Administration 2006